MRI: Development of a Surface Scattering System for Real-Time X-ray Studies of Growth and Processing + IMR: Development of a System for Studies of Surface Structure during Plasma Processing and Student Training

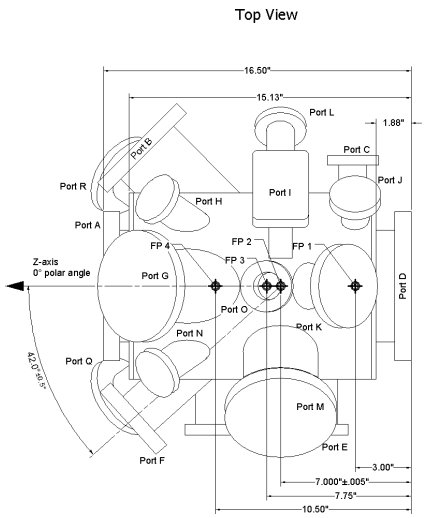
Karl Ludwig, Theodore Moustakas and Charles Eddy, Boston University

DMR-0116567, DMR-0114154

Recent Activity

The formation of the advanced materials that are at the forefront of science and technology requires increasingly sophisticated thin film growth techniques and surface modification regimens. With the aid of these two NSF Instrumentation grants, we are constructing a facility to examine these processes at the atomic level as they occur – the Advanced Materials Processing with In-situ X-ray characterization (AMPIX) System.

[The core of the AMPIX – the ultra-high vacuum (UHV) processing chamber – is shown at right]



This facility, to be utilized at the National Synchrotron Light Source (NSLS) of Brookhaven National Laboratory, will involve collaborators from throughout the Northeast.

[Shown at left is the recent NSLS Workshop on *In-situ Studies of Materials Processing*, jointly organized by Ludwig (1st row far right) and collaborator Randy Headrick of the University of Vermont (1st row third from right)]

MRI: Development of a Surface Scattering System for Real-Time X-ray Studies of Growth and Processing + IMR: Development of a System for Studies of Surface Structure during Plasma Processing and Student Training

Karl Ludwig, Theodore Moustakas and Charles Eddy, Boston University
DMR-0116567, DMR-0114154

Education, Outreach and Mentoring

We have used the project to introduce students in the Boston University High School Honors Summer Research Internship Program to materials research. Ludwig co-mentored the students, Scott Schwitz of New Jersey and Erica Chan of Washington state. Scott and Erica used atomic force microscopy (AFM) to examine Si (100) surfaces that had been ion bombarded as part of preliminary studies [Ludwig *et al.* **Applied Physics Letters 81** (2002)].

Picture above: Erica and Scott learning to use the AFM with the help of Boston University staff engineer Anlee Krupp.

Picture right: Erica, Scott and Karl Ludwig examining some of the AFM data. The AFM data could be directly compared to our previous x-ray measurements.